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Czeranowski's Flying Wing

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TAILLESS AIRCRAFT DESIGNED BY CHERANOVSKIY

The year is 1924; it is the site of the All-Union glider competition in the Crimea. A strange-looking "parabola" marked with the letters Bicz-1 attracts most attention among the various types of gliders due to the originality of its shape.

Some "experts" shake their doubting heads, while others look on without believing what they see. Will it fly or not?

Kudrin, the pilot, squeezes himself into the cockpit. The start takes place from a small hill. This is an important moment for the man standing to one side. He is Boris Ivanovich Cheranovskiy, the designer of the "parabola." Shortly, the first result and success is achieved: the "parabola" remains in the air for 1 minute and 20 seconds, flying a distance of 570 meters.

Cheranovskiy surmounted the usual difficulties which are at hand when designing new things that have not yet been tested. In 1925, he constructed a new glider, the Bicz-4, especially for entry in the Crimean competitions. The new machine retained the fundamental shape of the former "parabola." An innovation, however, was the lack of any vertical stabilizer. The first tailless glider [Bicz-1] had such a vertical stabilizer, situated on the middle part of the wing, in the form of a small triangle. These were the very first attempts, crowned with success, of adapting a tailless design for purposes of gliding.

Cheranovskiy did not limit his genius exclusively to the designing of tailless gliders. In 1927, for example, he constructed a glider marked Bicz-6 and having an original shape (parabolic wings). It flew at Koktebel that same year and achieved great success.

The design of this glider should be considered rather as a passing experiment on Cheranovskiy's part. During his later creative activity he never constructed a glider along orthodox lines.

In the year 1932, the board of Osoaviahim requested Cheranovskiy to engage in a grand project which preceded the capitalist "attainments" by a good fifteen years. The project involved the designing of a rear thrust aircraft for an already existing rocket-type engine, the latter having been designed and tested by the famous engineer Cander.

Cheranovskiy undertook this assignment with great enthusiasm. From the moment he received the request, his thoughts naturally centered exclusively around a tailless machine.

Those are the circumstances under which an original aircraft (Bicz-9), also called the "flying triangle," was created. The engine was placed in the rear part of the body and the cockpit with room enough for one pilot was located in the front end.

At the beginning of test flights, the aircraft was towed like a glider by an engine-propelled machine. After attaining a certain altitude, the pilot started his rocket-powered engine. The many experiments conducted with this tailless rear thrust aircraft (the first in the world) provided Cheranovskiy with the possibility of doing further successful work for the air force. By constructing fast, tailless aircraft, the designer was able to ascertain their characteristics and qualities under conditions of high-speed flying.

The Cander-type engine, as practical tests proved, was not

powerful enough to enable an independent start from the ground. Furthermore, it could be used only for flights at a constant altitude.

Cheranovskiy developed his concepts over a relatively short period of time. He transformed them into three subsequent designs. In the year 1932, the following tailless aircraft were produced: Bicz-11, 12, and 13. Again, the experiment assumed large proportions. Cheranovskiy, a close collaborator of CAGI, personally designed the profiles of his aircraft and tested their practical application.

The first two gliders possessed almost identical characteristics; they differed only in the profiles of their wings. Here are the data on Bicz-12, which was another "triangle": wingspan -- 14.25 meters, length -- 3 meters, wing surface -- 20.1 square meters, elongation [glide factor?] -- 10.1, net weight -- 100 kilograms, gross weight -- 180 kilograms.

The next tailless aircraft (Bicz-13) had the characteristic parabolic wing outline, so favored by Cheranovskiy.

The Bicz-13 was again a great achievement. This tailless aircraft had ideal stability at all axes of rotation despite the fact that the wing was straight and had neither elevators nor stabilizers.

During the Ninth All-Union glider competitions in the Crimea, the Bicz-13 model made flights of three minutes with the controls released by the pilot. The following may be mentioned as data concerning the Bicz-13: wingspan -- 14.3 meters, length -- 3.2 meters, wing surface -- 20 square meters, net weight -- 97 kilo-

grams, gross weight -- 177 kilograms.

Cheranovskiy never rested in his achievements but continued to create more modern designs. Over the years 1934 - 1935, he completed the design of a heavy tailless aircraft in collaboration with the engineer Kalinin.

The silhouette of a hitherto unseen aircraft, marked by the letters Bicz-14, could be observed by all inhabitants of the USSR capital at the Moscow airport on 1 May, 1937. The silhouette of this interesting aircraft is shown here in the form of a sketch. The Bicz-14 had two engines of the M-11 type, each with 125 horsepower. The engines were situated in the body [sic -- see sketch]. The short body had room inside for one pilot and four passengers. Despite the fact that this aircraft was only and experimental attempt (the first of its kind) at applying a tailless machine for purposes of air transportation, it is necessary to state that this experiment was successful from all points of view. The aircraft showed excellent qualities for piloting.

The Bicz-14 had the following characteristics: wingspan -- 15 meters, length -- 5.5 meters, maximum speed -- 250 kilometers per hour.

The year is 1949. The place is the Silikatnaya Station. This is where the annual All-Union competitions for flying aircraft models are held. An older, smiling man can be observed at the starting line among the many youngsters.

He has entered the competition with a large model of a tailless glider. He is surrounded by a group of competitors and can be heard as he eagerly provides them with advice and opinions.

Look, look, that is Cheranovskiy, say the voices around the group. Yes, that is so. Today, Boris Ivanovich has come to the model aircraft races. He has certain new concepts. He is again searching and testing. He is commencing his next project with a model aircraft.

The tailless glider which we saw sailing through the air so majestically a little while ago is the "prototype" of the prototype.

In 1949 Cheranovskiy's original glider attracted much attention om Air Force Day at the Tushino Air Base near Moscow. It had been constructed back in 1948 to honor the Thirtieth Anniversary of the Komsomol. The outstanding features of this glider are its small net weight (130 kilograms) and high safety factor. The wingspan is 7.5 meters, the wing surface 14 square meters, and the maximum speed 140 kilometers per hour.

Boris Ivanovich Cheranovskiy has made a great contribution to the development of tailless aircraft, not only in the USSR, but over the whole world as well. Many years of work were necessary for the creation of such a perfect design, from all points of view, as that of the Bicz-22. Many were the years of tedious computations, tests, successes, and even failures. Cheranovskiy's creativeness in aeronautical design shows what can be achieved by the scientist in the Soviet Union who patiently keeps at his goal. He has at his disposal all of the conditions necessary for work as a designer.

Cheranovskiy is an example of the great and leading creativeness of the people inhabiting the Country of the Soviets.

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